ONE LAPTOP PER CHILD

by Nicholas Negroponte

MIT Media Lab

Start with two assumptions. First, the greatest natural resource of any country is its children: no matter what the national challenge, from peace to poverty, disease or environment, education is always part of the solution. Second, from learning comes teaching, but a great deal also comes from exploration, interaction and sheer curiosity. In fact, that is how we learn how to walk and talk, not by sitting in a classroom. Schools serve many vital purposes. But school can carry a heavy price, especially for those children who are not serialist, compulsive, disciplined students. Furthermore, America's top-down education system, built around classrooms and teachers, typically does not leverage individual and peer-to-peer learning. This is a particular problem in developing countries.

We need to involve the children themselves, not just as learners but also as instructors and coaches, for themselves and others. The key here is not so much what each child knows, it is the point of view that he or she can bring to bear on a problem. We know from experience that such networked learning, augmented by technology, computers and connectivity, works supremely well. In 1982—together with Seymour Papert, a fellow professor at MIT—we put Apple IIs in primary schools outside Dakar. The Senegal programme showed conclusively that kids in remote, rural and poor regions take to computers easily. Four years later we launched a similar project on a larger scale in Costa Rica, which has become a model of what can be achieved with the right blend of computers and learning. It is no coincidence that integrated circuits today account for over 50% of Costa Rican exports, far more than bananas and coffee combined.

A decade later my family and I built primary schools in two Cambodian villages that are so poor (average income of $47 per year) and remote that they lack both electricity and running water; one even lacks road access. Our original intention was to build and move on. Instead, we took the further step of providing each schoolchild with a rugged, power-efficient laptop with Wi-Fi connectivity. At night, they took the laptops home, where the children and their families exploited the machines for every imaginable use, from tracking a favourite international soccer team's fortunes to researching the rice market and providing the brightest light source in the house. These kids' first English word was "Google". Internet connectivity is being addressed in a dozen different ways, including Wi-Fi, WiMax, 3G and satellites, as well as fibre, coaxial cable and plain old telephony. Competition, deregulation and the fact that the developing world is now the only new telecommunications market—all will contribute to wider reach, greater bandwidth and lower costs for connectivity. My help is not needed.

What is needed is a $100 laptop: a durable, versatile machine at a price the developing world can afford. But captains of the computer industry have told us that a $100 laptop simply can't be built. We disagree.

For this reason, MIT has spun out a non-profit association, called One Laptop per Child (OLPC), to design, manufacture and distribute laptops that will be provided to governments at cost and issued to children by schools on a basis of one laptop per child. These machines will be rugged, Linux-based and so energy-efficient that hand-cranking alone can generate sufficient power for operation. They will fold up into eBook mode for reading only. Mesh networking will give many machines Internet access from one connection.

Laptop economics

Here's how we'll do it. To start, at least 50% of a modern laptop's purchase price is swallowed by the cost of sales, marketing, distribution and profit. OLPC has none of those costs. Our device will not be available in retail channels, although to discourage a grey market we will authorise production of a commercial version, where a share of the profits will be dedicated to further lowering the cost of the OLPC machine. Distribution in most cases will simply piggyback on well-established textbook channels. The remaining 50% of the cost of a laptop can be divided into two roughly equal parts: the display, and everything else. Without question the display is the technical challenge. The Media Lab has short-term ways to bring the cost of a laptop display close to $30 and longer-term solutions like E Ink (which we invented) that could eventually be as inexpensive as 10 cents per square inch for a full-colour, sunlight-readable screen with better-than-textbook resolution in print mode.

The interesting part of laptop economics is the "everything else": the processor, memory and power management. Today's laptops use about 75% of their own processing capacity to support bloated software applications and the operating system itself. I am reminded of a suspension cable where after the span reaches a certain length, most of the strength required is to support the weight of the cable itself. Likewise, software has become self-serving, obese, more complicated and less reliable. The solution is a strict diet. In the case of the $100 laptop, this also means open-source software for kids all around the world to participate. For us, the answer is thus a "skinny" Linux operating system.

Will the $100 laptop happen? Yes. When? Late 2006. Where? Certainly in Brazil, Thailand and Egypt to begin with; we hope in China too. But the "market" is global, more than 1 billion schoolchildren worldwide, for whom one laptop per child is the goal.

***Professor Nicholas Negroponte** is chairman of the Media Lab, Massachusetts Institute of Technology.*